ABSTRACT OF THE DISCLOSURE

A discrete multitone stacked-carrier spread spectrum communication method is based on frequency domain spreading including multiplication of a baseband signal by a set of superimposed, or stacked, complex sinusoid carrier waves. In a preferred embodiment, the spreading involves energizing the bins of a large Fast Fourier transform (FFT). This provides a considerable savings in computational complexity for moderate output FFT sizes. Point-to-multipoint and multipoint-to-multipoint (nodeless) network topologies are possible. A code-nulling method is included for interference cancellation and enhanced signal separation by exploiting the spectral diversity of the various sources. The basic method may be extended to include multielement antenna array nulling methods for interference cancellation and enhanced signal separation using spatial separation. Such methods permit directive and retrodirective transmission systems that adapt or can be adapted to the radio environment. Such systems are compatible with bandwidth-on-demand and higher-order modulation formats and use advanced adaptation algorithms. In a specific embodiment the spectral and spatial components of the adaptive weights are calculated in a unified operation based on the mathematical analogy between the spectral and spatial descriptions of the airlink.